RAC affiliated
MISSISSAUGA amateur radio club
VE3MIS
25 Years

THE COMMUNICATOR

VOICE OF AMATEUR RADIO IN MISSISSAUGA

RAC

VE3MIS/VE3RCX | Vol 14.03 | March, 2011

From the Gavel…

Welcome MARC members to another Gavel by yours truly. We're into March now and I can't help but say it isn't soon enough! While I'm sure the meteorologists will say otherwise, Winter 2010-2011 has felt like an endless stream of cold, wind, snow and more cold. We did get a bit of reprieve in February when temps crawled their way above freezing, however, Old Man Winter wouldn't let us off that easy and the snow and cold returned! Anyway, enough complaining about stuff we have no control over and on with this month's Gavel.

Before I get going I wanted to take a moment to pass along my condolences to Tony, VA3QC, for the recent loss of his father, Walter John Champion, VE9AG (SK). Tony used to tell me about the regular HF skeds he would have with his father and the regular trips he would make to New Brunswick to visit. He will be missed and my thoughts are with Tony and the Champion family during this difficult time.

Now that we're into March you all know what that means? HAM-EX! This year's event will take place on Saturday, March 26, at our usual location at the Brampton Fairgrounds on Heart Lake Road and Old School Road. Rick, VE3IMG, is this years co-chair again and he has assembled a good group of volunteers for setting up vendor tables, working parking detail, assisting vendors when they arrive in the pre-dawn hours and buttoning things up when the hamfest shuts down. Having said that, he is always looking for more volunteers as there are always jobs that need to get done. One task for which we can never have too many hands is vendor assist. Rick will be making his Ham-Ex pitch at the next two General Meetings in March so please consider volunteering if you already haven't signed up. As an incentive, all MARC volunteers get into Ham-Ex for free. What a deal! We're also looking for gently used, high quality junque… er… electronics to sell at the MARC club table. Scott, VA3NMI, is heading up that task so please let him know what you have to donate. I have been told we can't accept CRT monitors and desktop computers, however, pretty much everything else is welcome. Lorne, VE3CXT, has also been selling raffle tickets for the grand prize of a $1000 Radioworld gift certificate. Just imagine the cool stuff you could add to the shack if you're that one lucky person! Lorne will continue to sell tickets at the upcoming General Meetings so plunk down your cash: $5 each or three for $10, and dream big! I can't stress enough how important Ham-Ex is to MARC's finances. Next to membership dues, Ham-Ex is THE most important fundraiser for MARC. The benefit to the club is enormous and the proceeds help promote and improve all aspects of the club. In many ways the success of MARC is reflective of the success of Ham-Ex and I hope you'll come out and show your support.

The MARC 25th Anniversary celebrations continue with several more MARC members recently earning their Mississauga DX Awards. Keep sending in those logs to Ed, VA3TPV, and you'll receive a fancy certificate and a photo spot in the next Communicator. We have also secured another special event call sign from Industry Canada for the upcoming CQ World-Wide WPX contest running from March 26 to March 27. MARC will be using VC3Z and we hope to rack up lots of contacts. Also, our 25th Anniversary banquet has been finalized and will be held at Mandarin Restaurant, 3105 Dundas Street West, Mississauga on Wednesday, April 27th at 6:30 pm. See the ad later in this issue of The Communcator for more information.

That about wraps it up for this month. Just a reminder that elections will be coming up soon so please consider running for one of the four Executive positions that will become open this year. And don't forget that Ham-Ex will be here in less than three weeks!

73, Jeff VA3WXM

This Month

1. **From the Gavel**
2. **Commentary**
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6. **Mississauga ARES Training Course**
6. **VE3MIS BBS Packet Saga**
7. **Getting Started with the New Digital Modes**
14. **MARC Repeaters**
14. **MARC Yahoo Group**
15. **RAC Application Form**

Sunday Brunch

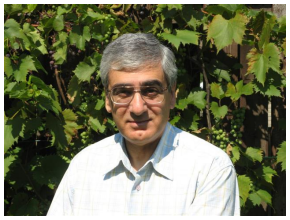
Sunday brunches are held on the first Sunday of each month. Time is 9:30AM at Symposium Restaurant, 6677 Meadowvale Town Centre Circle, Mississauga (at the corner of Winston Churchill Blvd and Battleford Rd). All are welcome to come out and have an opportunity to chat in an informal setting.

Club Nets

2 Metre Tuesday Night Phone Net Join in on the chatter starting at 8:30PM every Tuesday on the club repeater. Hosted by various net controllers. 145.430MHz Tone 103.5 Minus (-) offset. Contact our VHF Net Manager, **Lorne (VE3CXT)**, if interested in becoming a net controller.

75 Metre Sunday Night Net Starts at 8:30PM every Sunday. Hosted by various net controllers. 3.775 MHz +/- QRM. Contact our HF Net Manager, **Michael (VE3TKI)**, if interested in becoming a net controller.

Commentary



March has arrived and Old Man Winter has reminded us that he is still in control by showing his strength.

Jeff Stewart, VA3WXM, our president, in From the Gavel, has given a good summary of Ham-EX. Please read the gavel for how you can help MARC by helping out at Ham-Ex

The big news this month is the announcement of the MARC 25th Anniversary Banquet. See this article on page 4 for details.

This month, there have been additional recipients of the MARC DX Award Certificate and two club members returned to receive an additional endorsement for there DX Award. See the DX Award Update article for details.

Daniel Goodier, VE3NI, has written the Mississauga ARES Update for the previous month, March.

The article, Getting Started with the New Digital Modes, is written as a companion to the presentation of the same name given at the MARC club meeting on February 24th, 2011, given by Ed Spingola, VA3TPV. The presentation may be found on the MARC_Members Yahoo Group web site (http://groups.yahoo.com/group/MARC_Members/files/Members%20useful%20docs%20/General/)

The Communicator is one of MARC's methods for communicating information to club members and is your newsletter. Let me know what you would like the newsletter to be and what type of articles you would like it to include. I solicit your input on topics for articles i.e. antennas, kits you have built, great operating experiences, operating tips, book reviews, etc. for consideration by the technical committee.

Without your constant support in the form of ideas, suggestions and article submissions, we would not have such a fine newsletter month after month

I can be reached at any club meeting or via email at va3tpv@rogers.com

73, Ed Spingola (VA3TPV)

Executive Directors

President	Jeffrey Stewart, VA3WXM
1st Vice President:	Rick Brown, VE3IMG
2nd Vice President:	Ki-Hup Boo, VA3PEN
Treasurer:	Jim Brampton, VE3JIW
Secretary:	Asim Zaidi, VE3XAP
Past President:	Rick Brown, VE3IMG

Club Managers

Membership Manager	Brad Thomas, VA3ZRT
Education Manager	Earle Laycock, VE3XEL
House / Visitor Host Manager	Murray Yewer, VE3JMY
Newsletter Editor	Edward Spingola, VA3TPV
Net Managers HF Net	Michael Brickell, VE3TKI
VHF Net	Lorne Jackson, VE3CXT
Repeater Manager	David Shilling, VE3XDS
Assistant	Michael Brickell, VE3TKI
Assistant	John Lorenc (Sr), VA3XJL
Trustee	John Duffy, VE3DRZ
Club Station Manager	Rick Brown, VE3IMG
Assistant	Stefan Bejusca, VA3OBR
Assistant	Asim Zaidi, VE3XAP
Field Day Joint Chairman	David Kingsland, VE3MDX
Joint Chairman	Thomas Godden, VE3TWG
FSV Manager	David Malar, VA3MLR
Assistant	John Duffy, VE3DRZ
Program Manager	Thomas Bernard. VA3TMB
Assistant	Lorne Jackson, VE3CXT
Webmaster Manager	Rick Brown, VE3IMG
Assistant	T.B.D.
Legal Consultant	Lorne Jackson, VE3CXT
Public Info/ Media Relations	Tony Champion, VA3QC
Education Basic Course Prime	Earle Laycock, VE3XEL
Advanced Course Prime	Thomas Bernard, VA3TMB

Audit Committee

Auditors Coordinator	Basil Burgess, VE3JEB

Public Service

ARES Emergency Coordinator	Dan Goodier, VE3NI
Assistant	Thomas Bernard, VA3TMB
Assistant	Michael Brickell, VE3TKI
Assistant	David Malar, VA3MLR
Assistant	Bob Boyer, VE3XBB
Assistant	John Duffy, VE3DRZ
CANWARN Manager	Peter Mosher, VA3PKM
Special Events / Walks Manager	Bob Boyer, VE3XBB

Special Interest Groups

Contests Manager:	Asim Zaidi, VE3XAP
Assistant	Rick Brown, VE3IMG
QSL Manager	Michael Brickell. VE3TKI
Project Group:	Michael Brickell, VE3TKI

CLUB CALENDAR FOR 2010 - 2011

March, 2011
01 Tue VHF/UHF - 2 Meter Net
03 Thu Exec Meeting
04 Fri ARRL International DX Contest - SSB
06 Sun Sunday Brunch – Symposium Restaurant
06 Sun HF - 75/80 Meter Net
07 Mon Advanced Class 9
08 Tue VHF/UHF - 2 Meter Net
10 Thu Club Meeting - Speaker's night
13 Sun HF - 75/80 Meter Net
14 Mon Advanced Class 10
15 Tue VHF/UHF - 2 Meter Net
17 Thu ARES Meeting
20 Sun HF - 75/80 Meter Net
21 Mon Advanced Class Review
22 Tue VHF/UHF - 2 Meter Net
24 Thu Club Meeting - Speaker's night
25 Fri CQ WPX Contest – SSB
26 Sat HAM-EX Event
27 Sun HF - 75/80 Meter Net
28 Mon Advanced Class IC Exam
29 Tue VHF/UHF - 2 Meter Net

April, 2011
03 Sun Sunday Brunch – Symposium Restaurant
03 Sun HF - 75/80 Meter Net
05 Tue VHF/UHF - 2 Meter Net
07 Thu Exec Meeting
10 Sun HF - 75/80 Meter Net
12 Tue VHF/UHF - 2 Meter Net
14 Thu Club Meeting - Speaker's night
16 Sat Ontario QSO Party
17 Sun HF - 75/80 Meter Net
19 Tue VHF/UHF - 2 Meter Net
21 Thu ARES Meeting
24 Sun HF - 75/80 Meter Net
26 Tue VHF/UHF - 2 Meter Net
27 Wed MARC 25th Anniversary Banquet
28 Thu Club Meeting - Speaker's night

May, 2011
01 Sun Sunday Brunch – Symposium Restaurant
01 Sun HF - 75/80 Meter Net
03 Tue VHF/UHF - 2 Meter Net
04 Wed Field Day Meeting – Club Station
05 Thu Exec Meeting
08 Sun HF - 75/80 Meter Net
10 Tue VHF/UHF - 2 Meter Net
12 Thu Club Meeting - Speaker's night
15 Sun HF - 75/80 Meter Net
17 Tue VHF/UHF - 2 Meter Net
19 Thu ARES Meeting
22 Sun HF - 75/80 Meter Net
24 Tue VHF/UHF - 2 Meter Net
26 Thu Club Meeting - Speaker's night
27 Fri CQ WPX Contest – CW
29 Sun HF - 75/80 Meter Net

June 2011
02 Thu Exec Meeting
05 Sun Sunday Brunch – Symposium Restaurant
05 Sun HF - 75/80 Meter Net
07 Tue VHF/UHF - 2 Meter Net
09 Thu Exec Meeting
12 Sun HF - 75/80 Meter Net
14 Tue VHF/UHF - 2 Meter Net
16 Thu ARES Meeting
19 Sun HF - 75/80 Meter Net
21 Tue VHF/UHF - 2 Meter Net
23 Thu Club Meeting - Speaker's night
25 Sat ARRL Field Day Event
26 Sun HF - 75/80 Meter Net
28 Tue VHF/UHF - 2 Meter Net

NOTES
1. Meetings start 7:30PM at St. Thomas A Becket Church Hall, 3535 South Common Court unless otherwise noted.
2. Brunch is at 9:30AM unless otherwise noted.
3. Classes are from 7:00PM - 9:00PM at Meals On Wheels at 2445 Dunwin Drive

Visit our website: http://www.marc.on.ca for any updates of the calendar.

MARC 25th Anniversary Banquet

Sponsored by the Mississauga Amateur Radio Club

1985 - 2010

Mandarin Restaurant

3105 Dundas Street West

Mississauga, ON.

at 6:30 pm Wednesday, April 27th, 2011.

Join the fun. Door prizes. A night out!

Contact MARC Exec for any questions.

(MARC Members & Spouses)

In commemoration of MARC's 25th anniversary, 1985 – 2010, the Mississauga Amateur Radio Club (MARC) is sponsoring a night out, for club members and spouses. The event location is the Mandarin Restaurant, 3105 Dundas Street West, Mississuaga, ON.

The cost of the Mandarin evening buffet is $18.99 + taxes. Seniors (age 65+) receive a 20% discount.

This MARC 25th Anniversary Banquet is partially subsidized by MARC. MARC members are asked to pay an initial $10 towards the cost of the meal, for which they will receive a "Numbered Ticket." In return, MARC members will receive a $20 Mandarin Gift Certificate on the night of the banquet (one certificate per club membership, single or family) which is applicable against that night's dinner.

The "Numbered Ticket" will be used for a for "Door Prizes" to be held at the banquet.

Since the cost of the meal plus applicable taxes is likely to exceed the $20 gift certificate, MARC members are asked to pay any additional charges.

Remember to retain your "Numbered Ticket" and bring it to the banquet.

See you at the banquet.

The MARC DX Award Update

By Ed Spingola, VA3TPV

In commemoration of the 25th Anniversary of the founding of the Mississauga Amateur Radio Club (MARC), MARC has reintroduced the DX Award for the current club year running from September 1st, 2010, to June 30th, 2011. The DX Award rules were published in the October, 2010 issue of The Communicator and are also available on the MARC web site under Club Events/MARC Awards at http://www.marc.on.ca/marc/events/events_awards.asp .

This month we have a few more club members receiving their MARC DX Award. Here is a photo of Bob Hudson, VE3CWU, receiving his MARC DX Award at the February 10th, 2011 club meeting, from Ed Spingola, VA3TPV. Bob had achieved a level of 75 DX entities. Bob submitted a further log and received an endorsement seal for 100 DX entities at the February 24th club meeting. Good work to Bob in achieving this DX entity level.

The second photo is of Petar VE3EK, who submitted a log with 100 DX entities, receiving his DX Award certificate. Good work to Petar for this achievement.

Not to be outdone, Lorne, VE3CXT, submitted a log with 25 DX entities. Photo 3 shows Lorne, VE3CXT, receiving his DX Award.

Photo 1: Bob, VE3CWU, receiving his MARC DX Award from Ed, VA3TPV.

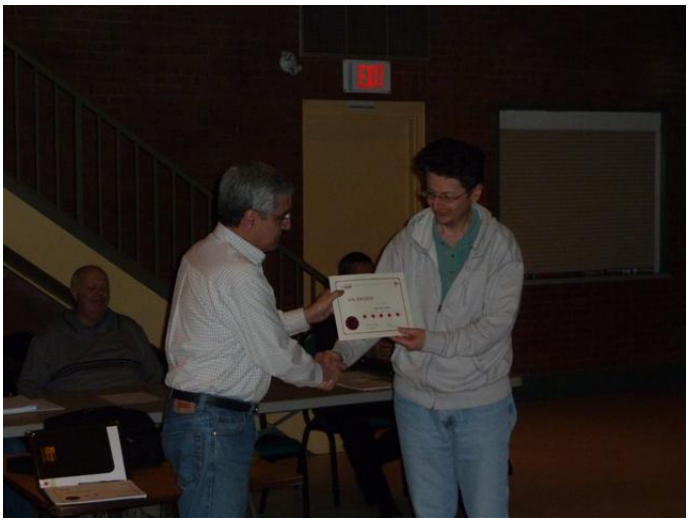


Photo 2: Petar, VE3EK, receiving his MARC DX Award.

It is good to see club members participating in the DX Award program. It is through operating that we experience the opportunities in our great hobby.

David, VE3MDX, submitted an additional log to bring his DX entities up to 50. Photo 4 shows David, receiving an endorsement sticker for his DX Award.

We are fast approaching the half way point in the club year, however, there is still lots of time left in the award period to submit your logs. Logs may be submitted to myself, Ed Spingola, VA3TPV, on paper, or via email (va3tpv@rogers.com).

Photo 3: Lorne, VE3CXT, receiving his MARC DX Award

Photo 4: David, VE3MDX, receiving his MARC DX Award endorsement.

Email submissions may be as an attached standard ASCII text format, or MS Word, or MS Excel file using standard MIME encoding. There is no need to submit QSL cards. If you need help converting your log from an ADIF file into an Excel spreadsheet for further editing, please let me know and I may be of some assistance.

73,

Ed, VA3TPV

ARES Corner

By Daniel Goodier, VE3NI

The ARES meeting on February 17, 2011 was held in the Ryerson Meeting Room at OZONE.

There were 5 members in attendance.

There were two major discussion points for this meeting.

The first item was ARES Training - Plans for 2011 ARES certification training was discussed. We are going to model the training based on the initial training we did in November 2009. The training will be 14 hours in total offered over two Saturdays. We are considering 2 options: 1) two consecutive Saturdays, such as the 9th and 16th of April or 2) two non-consecutive Saturdays, such as the 16th and 30th of April. The Training will be announced at the next club meeting, in the Communicator, and the MARC Yahoo Groups. We will limit the class size to 12 and if we cannot fill it with Club members we will consider opening the class up to other groups in the GTA West section.

The second item was an introduction to the subject of Narrow Band Emergency Messaging System (NBEMS). The group went over a NBEMS presentation compiled by Dave Kleber KB3FXI and Harry Bloomberg W3YJ. NBEMS consists of four programs: fldigi, flarq, flwrap and flmsg. Fldigi forms the basis for the suite of programs. Hardware, software and configuration information was also presented.

The meeting ended promptly at 9:00 PM.

TWO FURTHER NOTES:

- At the General Club meeting on Thursday February 24, 2011, Ed Spingola/VA3TPV made an excellent presentation, "Getting started with the New Digital Modes". The software he used to demonstrate using digital modes was fldigi, demonstrating that this is not ONLY software for emergency communication.
- On Saturday, February 26, 2011 at 10 AM (EST), NBEMS developers Dave Kleber, KB3FXI, and Western Pennsylvania Assistant Section Emergency Coordinator Harry Bloomberg, W3YJ, presented a two hour webinar that covered NBEMS's advanced features. We learnt about the use of NBEMS FLWRAP and FLMSG to send and receive spread sheet/database data and form-based messages such as the ICS-213 and NTS/Radiogram forms. Bloomberg and Kleber also covered HF digital net procedures and protocols and incorporated a live HF demonstration that was viewable by all 600+ viewers attending the webinar. The webinar was recorded and has been made available on DVD. Daniel/VE3NI has ordered a copy for training purposes

Mississauga ARES Training Course

By Daniel Goodier, VE3NI

Mississauga ARES presents ARES Operations Certification Training for members. Through interactive sessions we will discuss Emergency Operations, ARES roles and services, Preparation, Activation and mobilization, Net operation and etiquette, Emergency equipment and Digital communication.

This training is recommended for members who wish to obtain RAC ARES certification and for those who wish to renew their RAC ARES certification.

Duration: 14 hours, spread over 2 days

Time: Saturday, April 16 and Saturday, April 30, 9:00 am to 4:00 pm

Venue: Meals on Wheels, 2445 Dunwin Drive, Mississauga Fees: $25 (towards copy of training material, Official RAC ARES Id, refreshments. Any surplus funds will go to MARC general revenue fund)

Class size: 12 people max

Please contact Thomas Bernard/VA3TMB (va3tmb@rac.ca) or Daniel Goodier (ve3ni@rac.ca) for further information or to register for the course, before March 26, 2011.

VE3MIS Packet BBS Saga

By Michael Brickell, VE3TKI and Daniel Goodier, VE3NI

I am sure that most of you remember those warm days in mid-February right before the "big" blow (February 19-20). Those were the days when connecting to the packet BBS were a snap and all the digital operators were able to pass messages with ease.

Well after the "big" blow had worked its magic on the Force 12 40/80 beam (not a pretty sight) we found that the VE3MIS Packet BBS was performing inconsistently. While some of the ops were able to access the BBS the vast majority were unable to.

John/VA3XJL was able to consistently access the BBS and by his reckoning this was due to superior skill and equipment. Unfortunately Thomas/VA3TMB, Michael/VE3TKI, and

Daniel/VE3NI were unable to gain access to the BBS.

Preliminary troubleshooting showed that the BBS was able to hear VA3TMB and VE3NI and responded when contacted however neither VA3TMB nor VE3NI received the BBS acknowledgement. The BBS did not even hear VE3TKI when Michael attempted to connect.

With all these facts in hand it appeared as though the problem was an issue with the BBS 2m transceiver (possible low power/finals failing) after all, it is a Kenwood TR-4000A (70s era rig) or an issue with the BBS antenna (high SWR/wind damage).

Well the intrepid duo of VE3TKI and VE3NI went out last Saturday, February 26, to the Club station to see what was what. The plan was to sweep the antenna and if all was okay the 2m transceiver would be replaced.

Well wouldn't you know it but we got lucky on the first try and were immediately rewarded with a free trip to the roof and up the tower. The SWR across the 2m band was approximately 1:3.7 which explained the inconsistent accessibility to the BBS. John/VA3XJL was the closest distance wise to the Club station and while the high SWR impacted the radiated power it was strong enough for VA3XJL to receive it.

Once on the roof the weather decided to become more HAM-like and it started to snow. I mean if you are going to climb a tower and do a little antenna work in the Winter . . . it might as well be accompanied by falling snow.

The issue did not come as a complete surprise as we had encountered a similar issue when placing the antenna into production in the late Fall. It seems the Diamond antennas are sensitive to the diameter of the PL-259 tip, if the tip is larger then expected it cause a short in the connection assembly. In this case we were not seeing an open as we had the last time we had a problem but the solution was exactly the same. We took a patch cable where the PL-259 mated with the antenna connector smoothly and then connected the cable run from the 2m transceiver to the patch cable.

After the obligatory numbing of the fingers from working with cold metal objects in sub zero temperature we were finally finished, we thought. The packet station worked fantastically for less than a week, whereupon it abjectly failed again on Thursday night. So the next Saturday we were back, armed with a brand new antenna, which with extreme foresight, we just happened to have brought with us. Before we did anything, we checked the SWR to find it was high again. We immediately concluded that there was an antenna problem, so up to the roof we went, with the new one, which we proceeded to mount in the pouring rain. After several problems amounting to the inability to find a couple of tools, which, after a trip downstairs to borrow replacements, were found to be actually in the tool bag all along, we completed the installation, and then we went back down to the radio itself, very pleased with our excellent handiwork, only to find that the SWR was STILL a problem. At this point, we were severely tempted to pretend everything was fine, and just leave. However sanity prevailed, and after extensive consultation with the contest team, who happened to be at the station working a contest, we decided in desperation to remove the in-line barrel connector we had installed earlier, as well as the short jumper cable. It was back downstairs, to find success at long last. This fix seems to have done the trick (well, so far, anyway) and demonstrates the desirability of not using barrel connectors at vhf. We await further developments with bated breath…."

Of course the real reward was when everyone had been notified that the work was done and the reports of successfully being able to access the BBS were heard.

We encourage Club members both new and old to dust off their old TNCs and give the Club Packet BBS (VE3MIS-4 on 144.970 MHz) a try.

For further information on the VE3MIS Packet BBS contact Daniel/VE3NI.

Getting Started with the New Digital Modes

By Ed Spingola, VA3TPV

This article is written as a companion to the presentation "Getting Started with the New Digital Modes" given at the Feb. 24th, 2011, MARC general club meeting.

Introduction

What is a digital mode?

A digital mode is any transmission mode where the information transmitted is represented by 1 and 0 bit patterns.

Over the years, there have been many digital modes developed. The original digital mode was CW i.e. Morse Code. The first commercial RadioTeleType (RTTY) became available in 1922. Facsimile was first introduced in the early 1920's, but was not a true digital mode. Hellschreiber or Feldhellschreiber is a facsimile-based teleprinter mode invented by Rudolf Hell. Compared to contemporary teleprinters that were based on typewriter

systems, the Hellschreiber was much simpler and more robust, with only two moving parts. Hellschreiber has the added advantage of being capable of providing intelligible communication even over very poor quality radio or cable links, where voice or other teledata would be unintelligible. The Hellschreiber device was first developed in the late 1920s, and saw use starting in the 1930s.

I mention Hellschreiber since it has become a popular amateur radio mode in recent years.

RTTY was the predominant mode used for news services by the early 1940's, In the late 1940's when surplus TeleType models 19 and 26 became available, there was an emergence of RTTY among the North American amateur radio community. British amateur radio operators started using RTTY in 1956.

RTTY required a Model 19 or 26 teleprinter with a 60 ma current loop data interface. In the early 1980's this all changed when personal computers became available with names like Kaypro, Osborne, Timex, TRS-80, ZX-81, Apple II, Atari, etc. Basically the computer had replaced the teleprinter and made RTTY readily accessible to many more hams.

Some of the digital modes available in the 1980's were AMTOR, PacTOR, G-TOR, and CLOVER. However, if you wanted to get into the digital modes it meant having a computer interfacing to a hardware modem for the particular digital mode that you wanted to operate. The modem then interfaced to your transceiver.

The hardware modem provided the following functions:

1. Process ASCII data from the computer to produce audio to drive the radio's transmitter.
2. Process audio from the radio's receiver to convert to ASCII data for the computer to receive
3. Provide a way to key up the radio to put it into transmit

The function of the computer was basically as a terminal (teleprinter) emulator.

In the 1990's computers started to become available in the market with sound cards and a new approach was taken. Software developers began to use the DSP capability of the sound cards to process the audio tones formerly handled by the external hardware modems or the terminal node controller (TNC).

In 1998, Peter Martinez, G3PLX, developed BPSK31 and the Varicode symbol table. Peter utilized the sound card DSP to process the BPSK31 tones.

In 2000, Howard "Skip" Teller, KH6TY releases DigiPan (Digital Panoramic) for general use and a revolution in design had begun.

Some New Digital Modes

Some of the more recently developed digital modes are: BPSK31, QPSK31, MFSK16, MT63, FSK441, Olivia, WSPR, JT65A, Throb, DominoEX, SSTV, etc. and also digital voice: FDMDV (Frequency Division Multiplex Digital Voice). Many of the above modes also have several variations within each mode. So there are many modes to choose from.

Equipment Required

What equipment do you need to operate with the new digital modes? The new digital modes are predominately used on HF, although they could also be used on VHF/UHF. To operate with the new digital modes you need:

1. An SSB transceiver running at less than the full power output, 20 to 25 Watts typically.
2. Access to the following transceiver connections : Transmit Audio, Receive Audio, PTT and Ground,.
3. A Personal Computer (PC) running Windows or LINUX with at least one 16-bit Sound Card
4. An Interface between PC and Transceiver
5. Appropriate software for operating digital modes.

The computer you use for the digital modes does not need to be a super fast recent design. I have used Digipan BPSK31 with a Win 98 PC and a 16-bit sound card. However, for some of the newer modes which employ multiple simultaneous tones and forward error correction, you will need more processing power than a 266 MHz processor can provide. An older 1 GHz PC will suffice quite nicely. At my own station, I have a dedicated older vintage 9 year old PC with a 1.47 GHz processor for the digital modes. So don't throw out that older PC. It should still be useful in the Ham shack.

Similar to the computer–to-external modem or TNC hardware design approach, the computer sound card interfacing takes care of three things:

1. Audio from computer to radio to transmit.
2. Audio from the radio to the computer to receive
3. A way to key up the radio to put it into transmit

Casual Receive Only Setup

For casual listening, you can try receiving the digital modes by the acoustical interface method. With the acoustical method, place your laptop's or desktop PC's headset microphone near your radio's speaker as shown in Figure 1. In this manner the audio signals from your receiver will be acoustically coupled to the PC's microphone and into the sound card for processing.

Figure 1: Basic Casual Digital Receive Setup

The acoustical approach, however, is limited by the signal level available from the microphone. The laptop and the desktop PC soundcard microphone inputs are designed to work with an Electret type microphone. If you do not have a dedicated laptop or PC headset, try your favourite headset that you use with your base station or HT. I have found that these headset microphones work satisfactorily with this acoustical setup.

Using a laptop PC, setup, connect a headset with microphone to the appropriate jacks on the laptop or desktop PC. Open the Digipan program and configure the sound card. Then configure the Waterfall Drive and set the Mic Volume to its highest level.

If the waterfall does not appear, there is insufficient signal level. Click Advanced and select Microphone Boost. Close this window. Then the waterfall should start to appear. If the waterfall still does not appear try another headset. I have found that even the cheapest laptop headset microphone has also worked satisfactorily.

In an emergency when you want the message to get through, the acoustical method will work on both Tx and Rx. However, for a permanent setup, a more advanced interface will provide a more convenient method of operation.

Advanced Interface Requirements

Figure 2 shows the typical requirements for interfacing your transceiver to a personal computer.

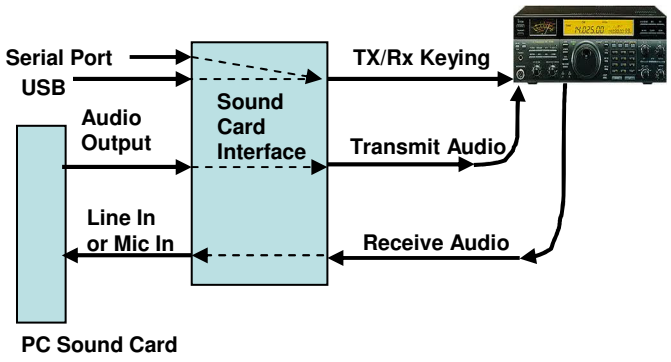


Figure 2: Advanced Interface Requirements

As per figure 2, you will need to obtain the receive audio output from your transceiver to connect to the sound card interface box. Some transceivers support an accessory socket, typically ACC(1), with connection to the receive audio output. This audio connection has an output level of between 100-300mv RMS independent of the receiver's volume (AF) control. If an accessory output is not available, then use the transceivers speaker output.

Tx/Rx keying and PTT is usually handled through the transceivers front panel microphone jack although in some transceivers, an accessory jack may also be available for this function. Some transceivers may also support a modulation input signal connection through one of the accessory jacks.

If you are using a laptop as compared to a desktop PC, then a mic input would be used for the receive audio connection. On a desktop PC you may have the choice of either a Line In or Mic In depending upon the resident sound card.

Whatever approach is used on the PC, remember to turn off or disable the Windows beeps and tones, etc via the Windows sound manager. You don't want these extraneous tones to go out over your radio.

Depending upon the type of sound card interface used, either a USB or a serial port may be required on your PC. This port is used for Tx/Rx control and PTT.

Commercial Sound Card Interface Hardware

There is a wide selection of commercial sound card interface hardware available and I am sure that you will be able to find on the internet more examples of the representative hardware which I have described in the following paragraphs. I do not favour any one brand over the other or any one particular configuration. The choice of the sound card interface hardware and equipment configuration will depend upon your specific circumstances i.e. are you using a laptop or desktop PC? , are serial ports available? , can the sound card be shared with other programs? , is external power available?, etc.

West Mountain Radio

West Mountain Radio[32] is a popular manufacturer of a number of different sound card interfaces:

1. RIGblaster Duo
2. RIGblaster Pro
3. RIGblaster Plus II
4. RIGblaster Nomic

Here I will look at RIGbalster Plus II and the RIGblaster Nomic.

RIGblaster USB Plus II

The RIGblaster Plus II connects to your PC's USB port and is powered from USB port. The RIGblaster Plus II has a built in USB-to-serial converter supporting the PTT, CAT, and CW/FSK functions. The RIGblaster Plus II provides Tx level adjustment and an isolation transformer for the Tx audio. Isolation transformers for the audio are desirable to prevent ground loop introduced noise. The RIGblaster Plus II does not provide an Rx isolation transformer.

The RIGblaster Plus II Mic Input has a series of jumper settings to accommodate various transceiver models. With the RIGBlaseter Plus II, your desk microphone is connected to the RIGblaster Plus II front panel. The RIGBlaster Plus II employs Mic/Computer switching to switch the audio from the computer to the transceiver and to disconnect the desk microphone when the PTT is activated. In this manner any room audio is blocked

from reaching the transceiver while transmitting the digital modes.

Figure 3 shows the computer to transceiver connections for the RIGblaster Plus II. This diagram is applicable to when the PC is either a laptop or a desk top computer.

RIGblaster Nomic

The RIGblaster Nomic (No-mic) connects to your PC's serial port and does not require a separate power source. The RIGblaster Nomic requires a PC with a serial port or a USB-to-serial converter. to provide the PTT and TX/RX switching. The RIGblaster Nomic provides Tx level adjustment and an isolation transformer for the Tx audio. An isolation transformer is not provided for the RX audio. Isolation transformers for the audio are desirable to prevent ground loop introduced noise.

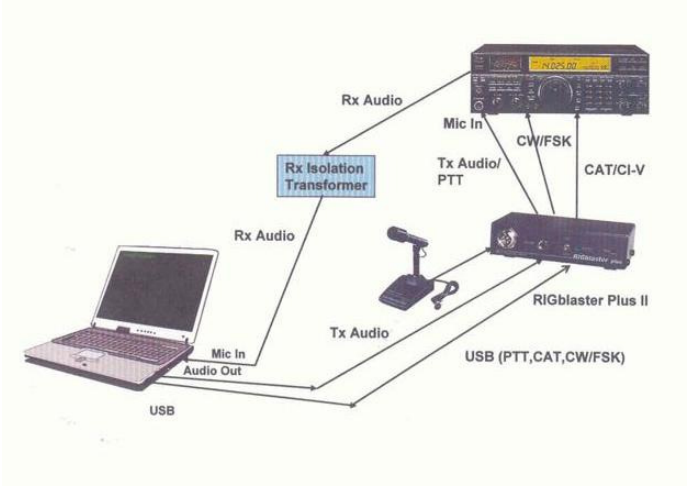


Figure 3: RIGblaster Plus II Setup

The RIGBlaster Nomic Mic Input has a series of jumper settings to accommodate various transceiver models. Figure 4 shows the computer to transceiver connections for the RIGblaster Nomic. This diagram is applicable to when the PC is either a laptop or a desk top computer.

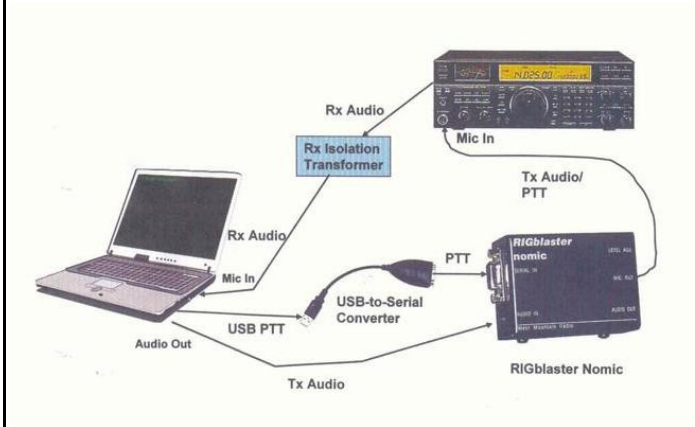


Figure 4: RIGbalster Nomic Setup

TigerTronics

SignaLink USB

TigerTronics[16] is another popular manufacturer of sound card interface circuits. The TigerTronics SignaLink USB interface connects to your computer by a USB cable, from which it derives operating power. The SignaLink USB includes a built in sound card and a USB to Serial Converter. The SignaLink USB supports USB TX/RX control and has both TX and Rx audio isolation with front panel level adjustments. This can be an advantage since you do not have to mess with the Windows Audio Mixer settings each time you change your operating mode from voice to digital. Figure 5 shows a setup for the SignalInk USB. Notice that only three cables are required.

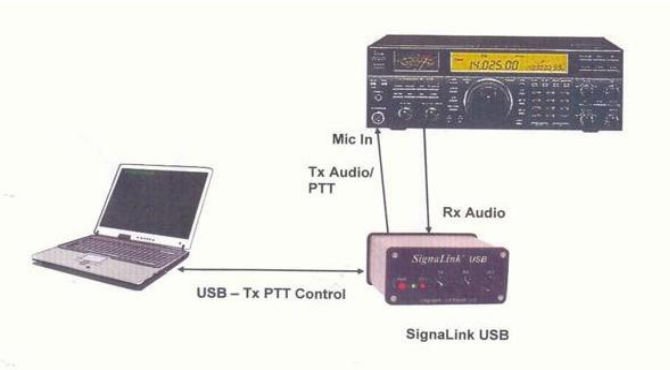


Figure 5: SignaLink USB Setup

RigExpert

Another source of sound card interface circuits is the RigExpert product line[17]. Two of the many products produced by RigExpert are the RigExpert Tiny and the RigExpert Standard.

RigExpert Tiny

The RigExpert Tiny, shown in figure 5 is a physically small interface unit which is powered from the USB port. The Tiny provides CAT Control and a 2nd serial port for PTT/CW).

Figure 5: RigExpert Tiny

RigExpert Standard

The RigExpert Standard, shown in figure 6, has a Built in Sound Card. The unit is powered from USB port. The Standard supports USB Tx Control, Tx and Rx front panel level adjustment, PTT LED, an extra serial port for CAT Control, and isolation transformers for the Tx and Rx audio. Be sure to order the specific cable for your Transceiver

Figure 6: RigExpert Standard

DIY Interface Circuits

The Hams who are handy with a soldering iron and a few tools can construct their own sound card to computer interface circuit with a little bit of time and effort. There are many simple interface circuits which have appeared in the Ham radio journals over the past ten years. Sound card interface circuits may also be found on the Internet. However, two circuits are noteworthy because of their extra simplicity. These circuits by Howard "Skip" Teller, KH6TY, the developer of Digipan, may not have a lot of "bells and whistles" but they work. The following two circuits by Skip can be built on vero or perf board and the layout and wiring is not critical. In some cases a well stocked "junque box" will most likely furnish most of the parts.

KH6TY VOX Circuit

The KH6TY Digital VOX[11] circuit, shown in figure 7, samples the out going transmitted audio signal and rectifies this signal to produce the drive voltage necessary to turn on the PTT transistor creating a grounded PTT signal used to activate your transceiver.

This VOX circuit should only be used with transceivers which support an "open collector" transistor switch for transmit/receive switching.

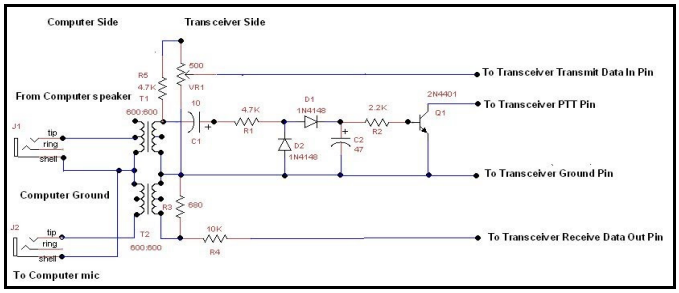


Figure 7: KH6TY Digital VOX Circuit

The Digital VOX circuit works well with PSK and AFSK RTTY modes but does not work well with CW or Hellschreiber. For these types of signals, an interface which works off of a serial port to keep the transceiver in transmit until the software returns it to receive would be more appropriate.

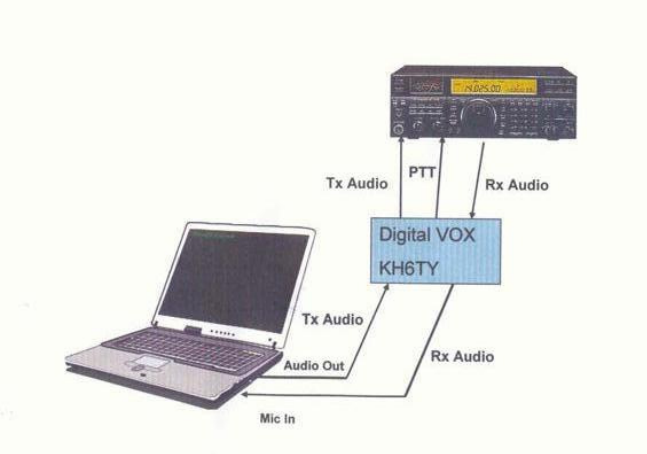


Figure 8: KH6TY Digital VOX Setup

KH6TY Serial Port Circuit

The KH6TY Serial Port Circuit[10], shown in figure 9, is similar to the Digital VOX circuit except for the addition of a serial port used to control the transmit/receive function.

The KH6TY Serial Port Circuit's computer to transceiver setup is similar to the VOX circuit but requires a USB to serial converter if interconnected to a laptop computer.

This circuit should only be used with transceivers which support an "open collector" transistor switch for transmit/receive switching.

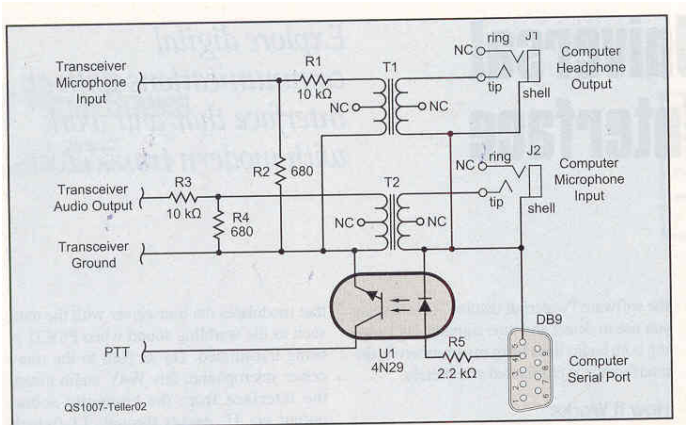


Figure 9 : **KH6TY Serial Port Circuit**

Sound Card Calibration/Setup

If you are running Digipan with BPSK31, you do not need to be concerned about the sound card calibration. However if you are using some of the other modes which are dependent upon

accurrate sound card timing, then you must determine the error in the sound card's sampling rate in order to make corrections. The process of determining the sound card sampling rate error is called calibration. The determination of the error in the sound card's sampling rate may be determined by running a program called CheckSR[35].

The following settings are suggested to set up the sound card:

1. Set audio input controls to mid range
2. Waterfall Drive (Recording Control)
3. Transmitter Drive (Volume Control)
4. Set sampling rate to 11025 or Native
5. Save Sound Card Setting to QuickMix

For a description of Sound Card calibration see the February, 2011 issue of The Communicator, Vol. 13.02.

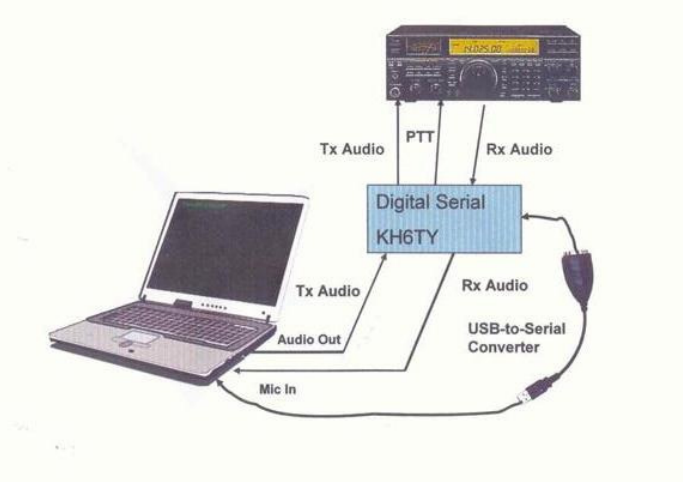


Figure 10: KH6TY Digital Serial Setup

Transceiver Setup

To properly transmit any of the digital modes you must setup your transmitter properly to avoid over modulation. Set up your transmitter as follows:

1. Turn Off Audio DSP
2. Turn Off Speech Compressor
3. Leave Transceiver Mic setting for Normal Speech
4. Do not overdrive transmitter (Causes band splatter)
5. Adjust RF PWR slightly less than MAX
6. Adjust Tx drive level via Sound Card Interface for 20 – 25 watts RF output
7. ALC should not show any indication

Check your output signal with an IMD Meter or a PSK Meter. Alternatively ask the receiving station for IMD Report

Receiver Setup

To properly setup your receiver do the following:

1. PSK is USB mode by convention
2. Use audio output accessory jack if available (Independent level of AF setting)
3. Otherwise use speaker output (level dependent on AF setting)
4. Do not over or under drive sound card input

IMD Monitoring

Intermodulation distortion (IMD) is a result of over driving your transmitter with too much audio. Two products that allow you to monitor your IMD are the IMD Meter[24] by KK7UQ,and the PSKMeter by KF6VSG[26].

Figure 11: IMD Meter by KK7UQ

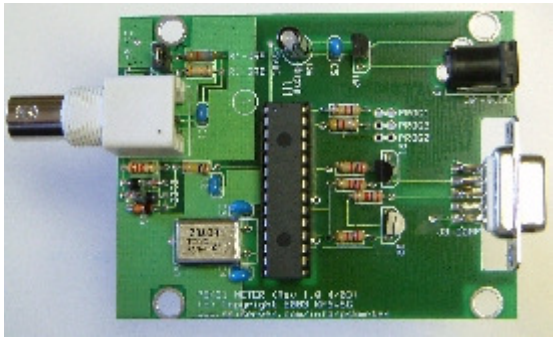


Figure 12: PSK Meter by KF6VSG

Here are some key features of these units:

IMD Meter, KK7UQ

1. Available as a Kit or Fully Assembled
2. Measures IMD by monitoring transmitted RF
3. Stand alone Unit

PSK Meter, KF6VSG

- Available as a Kit or Fully Assembled
- Measures IMD by monitoring transmitted RF
- Connects to PC's Serial Port
- Computer connection to automatically adjust transmit drive level

For more details on these the IMD Meter and the PSK Meter products see the Sept. 2009, issue of the Communicator, Vol. 12.09.

Sound Clips

Web sites where sound clips of some digital modes may be obtained are given in the Bibliography located at the end of this article. Along with the sound clips are the corresponding "Waterfall" representation and in some cases the spectral distribution is shown. Of particular interest is the Digital Modes – Sight & Sound web page by W1HKJ[30].

PSK Operating Tips

Here are some operating tips to get the most out of your PSK operating experience.
Automatic Frequency Control (AFC) can be used to track PSK signals. However, the use of AFC can lead to wandering off freq (tracks noise). Keep an eye on the waterfall to see if your signal is tracking up the band causing QRM. If this happens, then turn off the AFC and select *Lock Frequency* instead. It is also good operating practice to Set Squelch level to avoid noise being detected as false characters

Frequencies

The following figure13 [35] by Harold Melton, KV5R, Athens Amateur Radio Club, shows the suggested frequency of operation for the various digital modes. The best place to look for frequencies of operation is on the Internet. Just search "<mode> Frequencies" and you will find many hits.

Band	RTTY Pactor	PSK31	MFSK Throb	MT63	Hell	SSTV	Fax	Packet
160	1800 - 1840	1838	1838	1822, 1838.15				
80	3580 - 3620	3580	3580	3580.15, 3590, 3635	3575, 3580, 3559	3730, 3845	3730	3620, 3620.9, 3623.9, 3627.9, 3635, 3638.9
40	7040 - 7100	7070, 7035	7037	7035.15, 7037	7030, 7035, 7037, 7040	7171		7068.9, 7070.9, 7071.9, 7072.9, 7073.9, 7076.9
30	10130 - 10140	10140	10147	10140.15, 10145	10135, 10137, 10145			10124.9, 10125.9, 10126.9, 10133.9, 10136.9, 10140, 10150
20	14070 - 14100	14070	14080	14106.3, 14109.3, 14114	14063, 14064, 14070	14227, 14230, 14233	14227	14062.9, 14072.9, 14073.9, 14074.9, 14075.9, 14076.9, 14095, 14099.5
17	18100 - 18105	18100	18105	18105, 18100.15	18100, 18105			18101.9, 18105, 18107.9, 18110
15	21070 - 21100	21080	21080	21130	21070	21340, 21335	21335	21072.9, 21100, 21110
12	24920 - 24925	24920	24929	24925				24925, 24930
10	28070 - 28150	28070, 28120	28080	28130	28063, 28070, 28100, 28110, 28120	28675, 28680	28675	

Figure 13: Frequencies

Hope to see you "On The Waterfall."

Bibliography

Software

1. Peter Martinez, G3PLX, "PSK31: A New radio-Teletype Mode," QEZ July/Aug 1999, pages 3-9 (reprinted from RadCom, Dec 1998 and Jan. 1999 issues)
2. PSK31 "Official Homepage", Peter Martinez, G3PLX, http://aintel.bi.ehu.es/psk31.html
3. Digipan by Howard "Skip" Teller, KH6TY, http://www.digipan.net/
4. NBEMS/FLDIGI, http://wpanbems.org/w1hkj.htm
5. Ham Radio Deluxe, http://www.ham-radio-deluxe.com/
6. MMTTY, MMSSTV, MMVARI, http://mmhamsoft.amateur-radio.ca/

Interface Circuits

7. Howard "Skip" Teller, KH6TY, A Sound Card Interface or FM Transceivers, QST, June, 2009, pages 30
8. Howard "Skip" Teller, KH6TY, A Sound Card Interface or FM Transceivers (July 2009 QST, pp 30-31) (Feedback)
9. Steve Ford, WB8IMY, PSK31 This Weekend, QST, January, 2010, pages 30-31
10. Howard "Skip" Teller, KH6TY, The Classic Universal Sound Card Interface, QST, July, 2010, page 37-39
11. Howard "Skip" Teller, KH6TY, Digital VOX Sound Card Interface, QST, March, 2011, page 34-36
12. Walter Kaelin, KB6BT, A Vox Circuit for PSK31, QST, Dec. 2005, pages 58-58
13. Larry Koyle, K1QW, An Improved Digital Communication Interface, QST Apr. 2005 p31-35

Books

14. ARRL's HF Digital Handbook, 4th Edition, 2007, The American Radio Relay League, Inc.

Interface Hardware

15. West Mountain Radio RIGblaster Plus II Sound Card Interface, QST, Feb 2011, page. 40
16. TigerTronics SignaLink USB Interface, QST, April, 2008, page 68
17. West Mountain Radio, http://www.westmountainradio.com/content.php?page=rigblaster
18. RigExpert, http://www.rigexpert.net/main.html
19. NBEMS/FLDIGI Sound Card Calibration, http://wpanbems.org/fldigi_calibration.htm

PSK31 Tuning Aids

20. Ed Spingola, VA3TPV, PSK Operating Aid, The Communicator, Sept. 1999, Vol. 12.09.
21. Steve Ford, WB8IMY, The Skunk at the Digital Party, QST, December 2007, pp 50.
22. K7AGE, PSK31 Transmitter Level Adjustment, http://www.youtube.com/watch?v=I3CwHaX7t5M

23. Steve O'Neal, N6CRR, The Good, The Bad and the Ugly on PSK31, http://www.eham.net/articles/12626

24. IMD Meter by KK7UQ, http://kk7uq.com/html/imdmeter.html

25. Steve Ford, WB8IMY, PSK Meter, QST, February 2004, p 66

26. PSKMeter by KF6VSG, http://www.ssiserver.com/info/pskmeter/

27. QuickMix, http://www.ptpart.co.uk/quickmix

Videos

28. Randy Hall , K7AGE, Soundcard Interfacing http://www.youtube.com/watch?v=FmsFhz_dyAg

29. Randy Hall, K7AGE, PSK31 Transmitter level Adjustment, http://www.youtube.com/watch?v=I3CwHaX7t5M&feature=mfu_in_order&list=UL

Sound Clips

30. http://www.w1hkj.com/FldigiHelp-3.20/Modes/index.htm

31. http://wb8nut.com/digital/

32. http://kb9ukd.com/digital/

33. Digital Mode Samples 1 http://www.youtube.com/watch?v=lOmrgJkFY40

34. Digital Mode Samples 2 http://www.youtube.com/watch?v=b3Yy1pmnyu0&feature=related

Operating Frequencies

35. Harold Melton, KV5R, Athens Amateur Radio Club, http://www.athensarc.org/digital-modes.asp

MARC Repeaters

VHF Repeater at 145.430 MHz (-600 kHz) (CTCSS Tone 103.5Hz)

UHF Repeater operating on 444.575 MHz (+5.0MHz) (CTCSS Tone 103.5Hz)

6M Repeater operating on 53.250 MHz (-1.0MHz) (No CTCSS Tone)

All repeaters except 6M use a CTCSS tone squelch of 103.5Hz

MARC Members Yahoo Group

The MARC_Members Yahoo Group is the primary way to disseminate club information about upcoming events.

Join the MARC_Members Yahoo Group to receive club related communications and to contact other club members.

http://groups.yahoo.com/group/marc_members/

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